

California's Zero Emission Vehicle Program

California Air Resources Board

June 2009

1. Viewer Window

The screenshot shows a Citrix desktop environment with a window titled "GoToWebinar Viewer". The window displays a presentation slide with the following content:

- CB Presentations™**
- Give Online Punch**
- Audio: Use your microphone and speakers (VoIP) or call in using your telephone.
- Dial: (805) 879-4135
- Access Code: 105-748-644
- Audio PIN: 74
- Speaker photo and name: Corena Bahr, CEO and Founder, CB Presentations

The desktop background is green. At the bottom, there is a Citrix taskbar with icons for Network and Recycle Bin, and a Windows taskbar with the Start button, taskbar, and system tray showing the time as 4:11 PM.

2. Control Panel

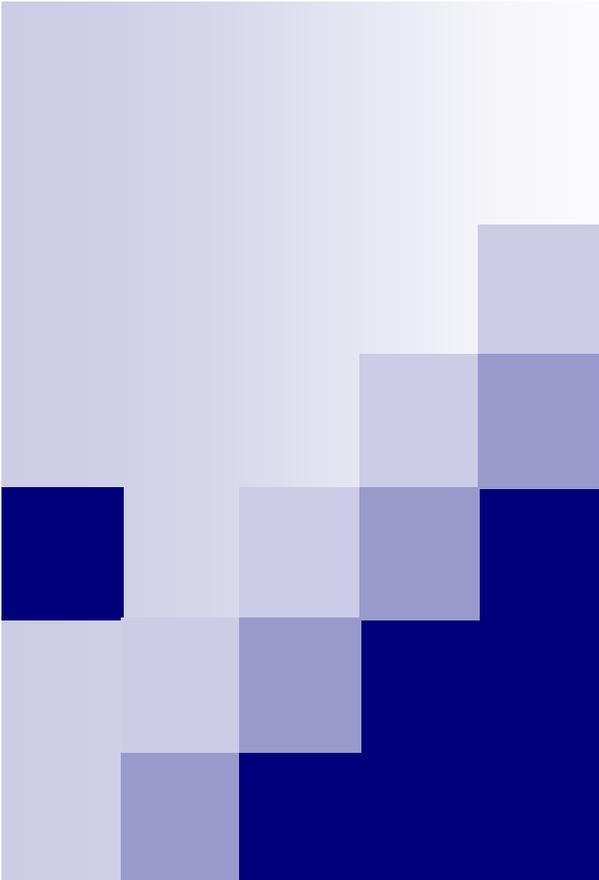
The screenshot shows the "GoToWebinar Control Panel" window. It has a menu bar with "File", "View", and "Help". The "Audio" section is expanded, showing options: "Window" (checked), "Auto-Hide the Control Panel" (checked), and "Hide Control Panel". Below this is a "Questions" section with a "Questions Log" containing the text: "Welcome! Please type any questions/comments in the Question and Answer section of your control panel." There is an input field with the placeholder "[Enter a question for staff]" and a "Send" button. At the bottom, it displays "Give Online Punch" and "Webinar ID: 576-794-892".

GoToWebinar Attendee Interface



Overview

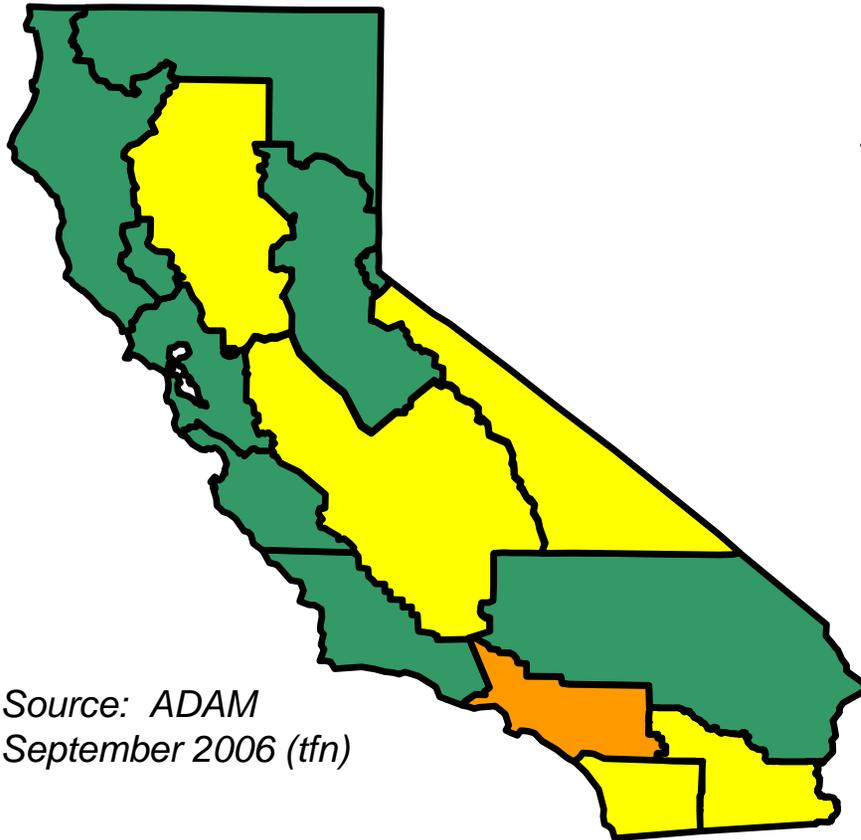
- Why have a ZEV regulation?
- History: How did we get here?
- The 2009 Regulation
- ARB's role in ZEV Commercialization
- Section 177 States
- Looking Forward: ZEV 2.0
- Conclusion



Why have a ZEV
regulation?

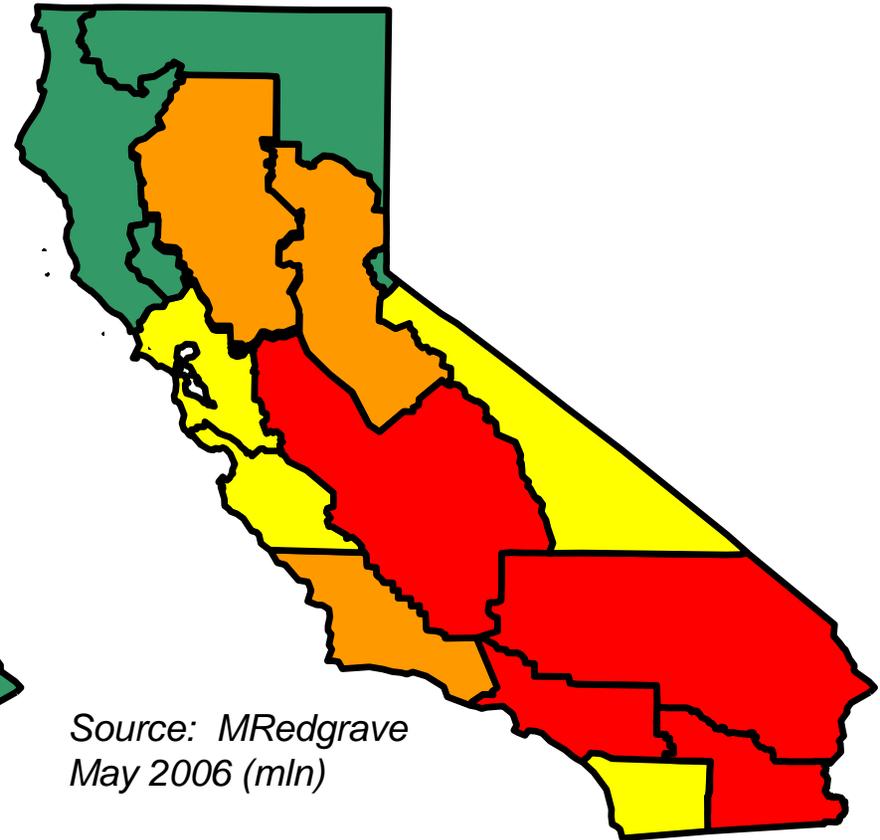
Over 90% of Californians Breathe Unhealthy Air at Times

*Days Over State 24-Hour
PM10 Standard*



Source: ADAM
September 2006 (tfn)

*Days Over State 8-Hour
Ozone Standard*



Source: MRedgrave
May 2006 (mln)

0-5 Days

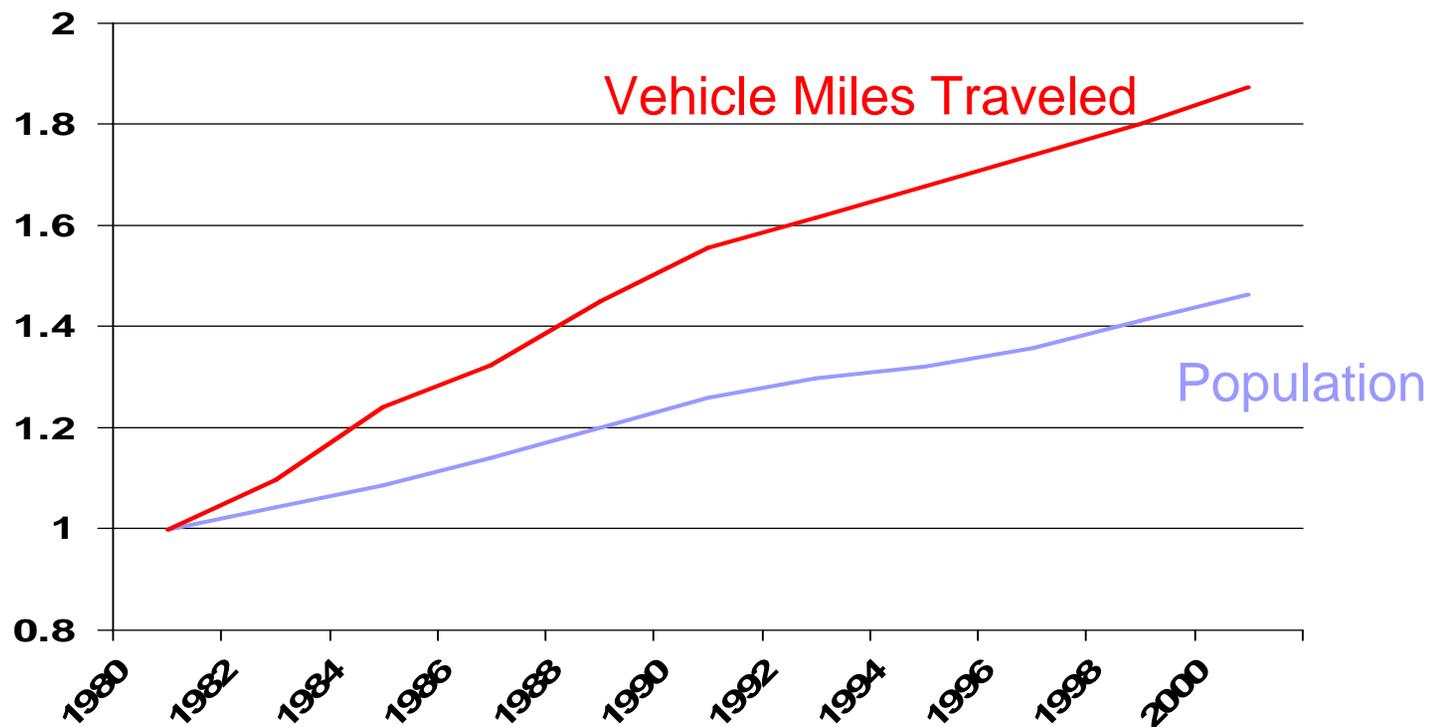
6-50 Days

50-100 Days

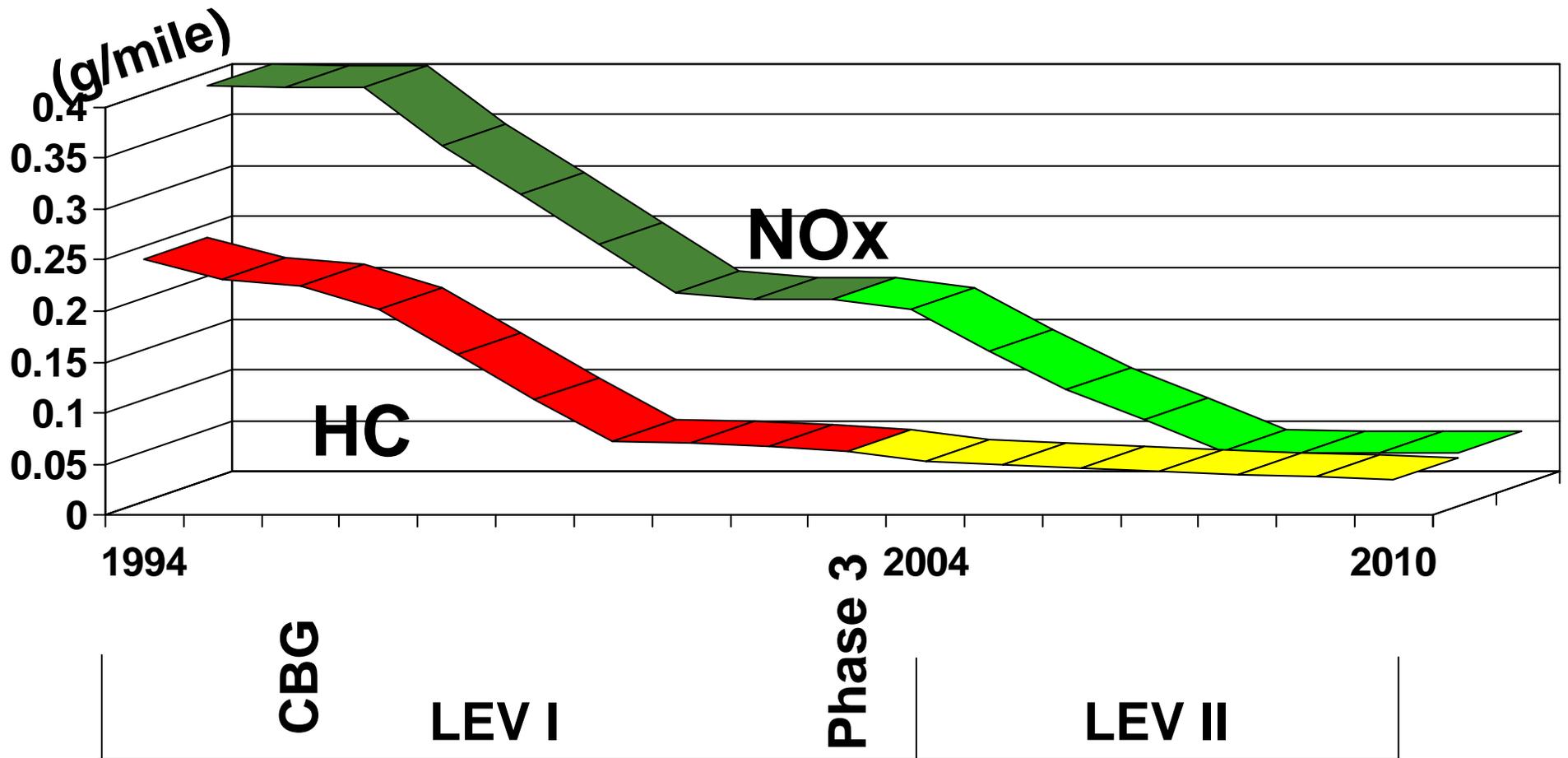
>100 Days

The Challenge...

- Over 23 million registered vehicles
- Over 797 million miles driven every day
- Over 37 million gallons of gasoline consumed each day



Goal is Near-Zero Emissions



Climate Change in California

California Projected Impacts

- 75% loss in snow pack
- 1-2 foot sea level rise
- 70 more extreme heat days/year
- 80% more 'likely ozone' days
- 55% more large forest fires
- Twice the drought years

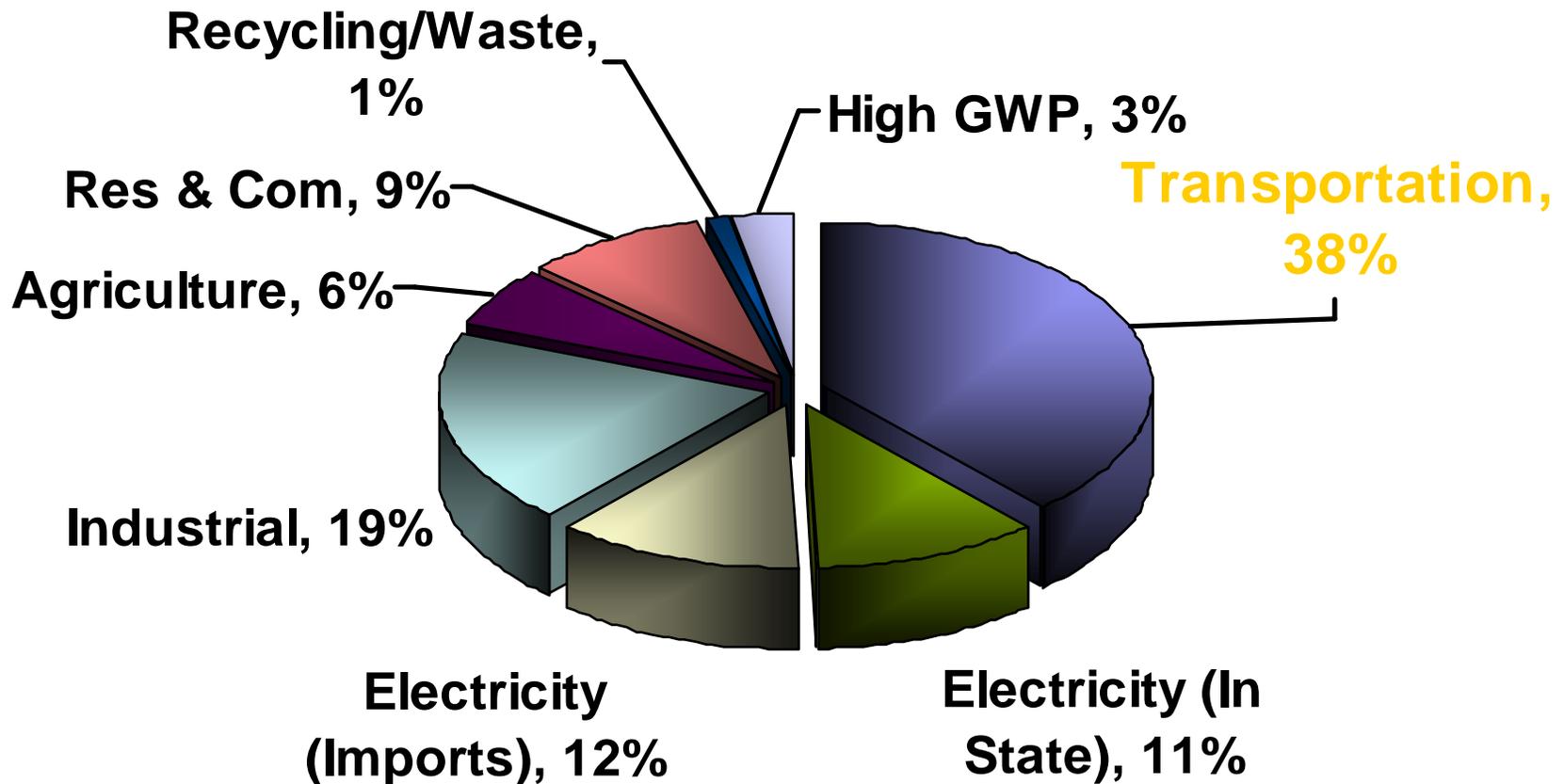




California GHG Goals

- Initiated through AB 32:
 - AB 1493: Pavley Regulation
 - By 2020, reduce GHGs back to 1990 levels
 - By 2050, reduce GHG 80% from 1990 level by 2050

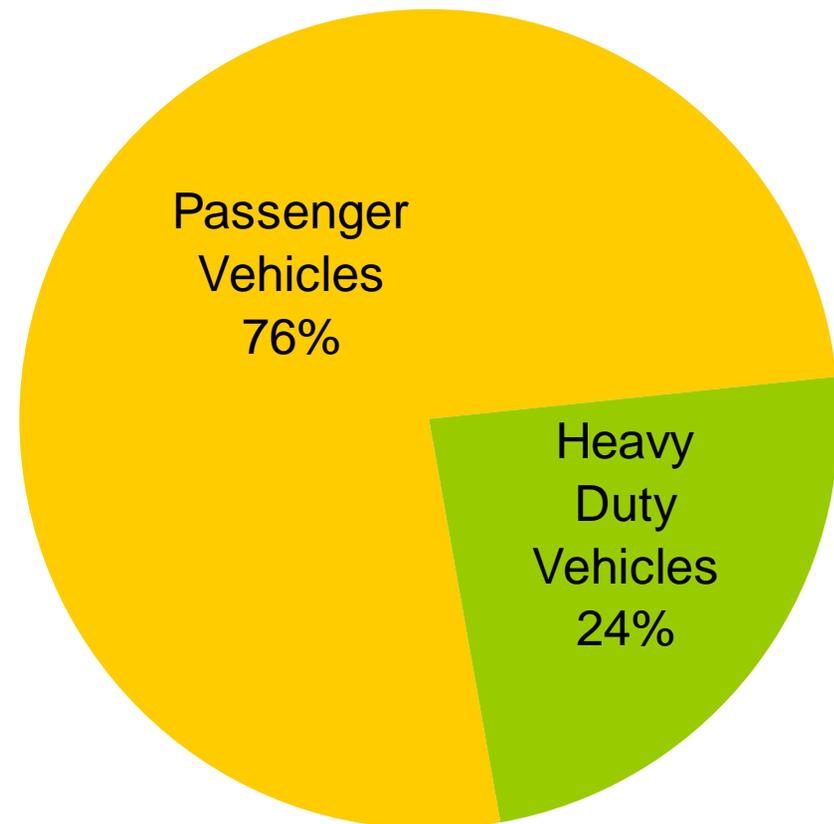
2002-2004 GHG Emissions (469 MMTCO₂E)



On-Road Transportation Sources 2020

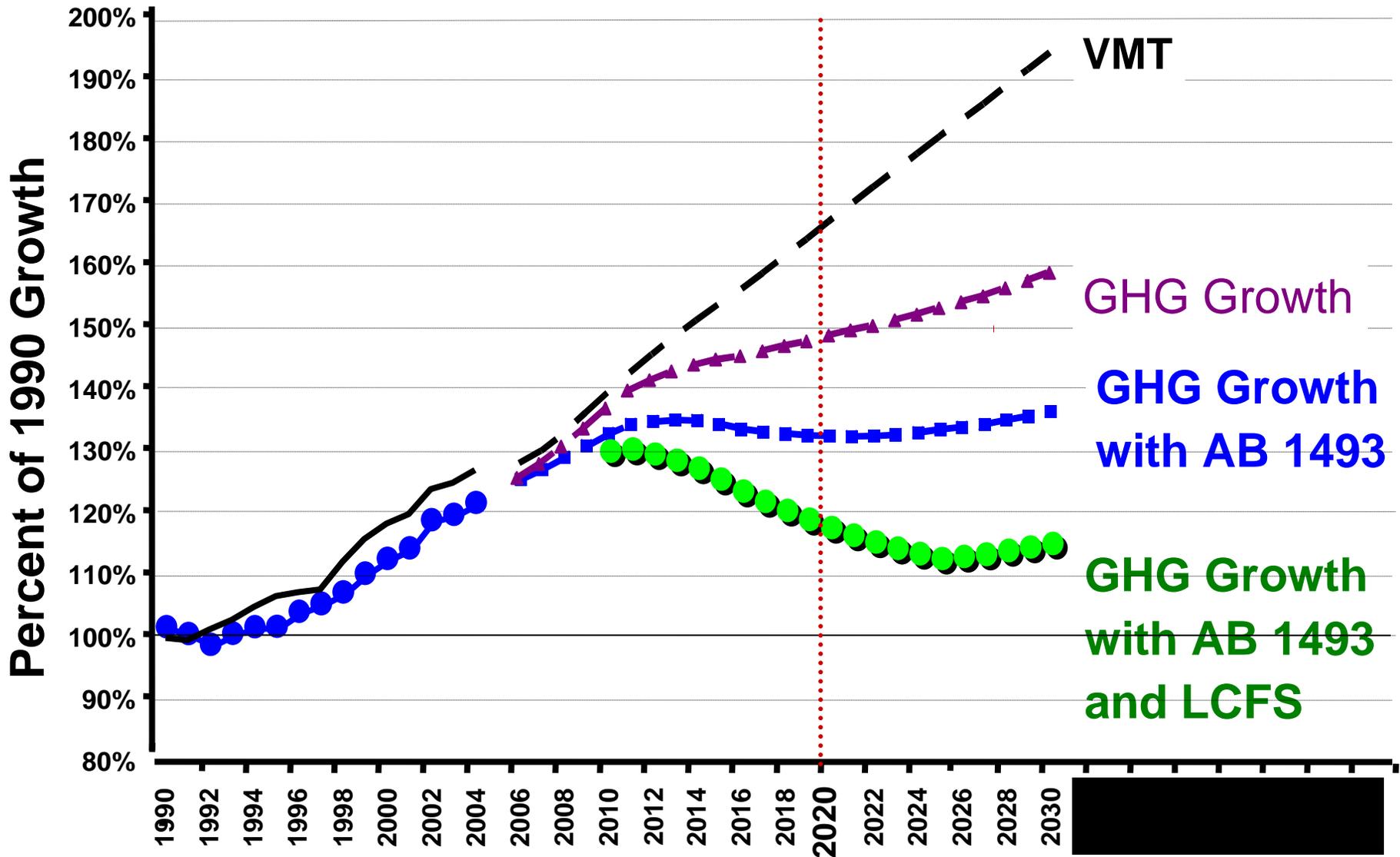
Passenger Vehicles
~ **160 MMTCO₂E**

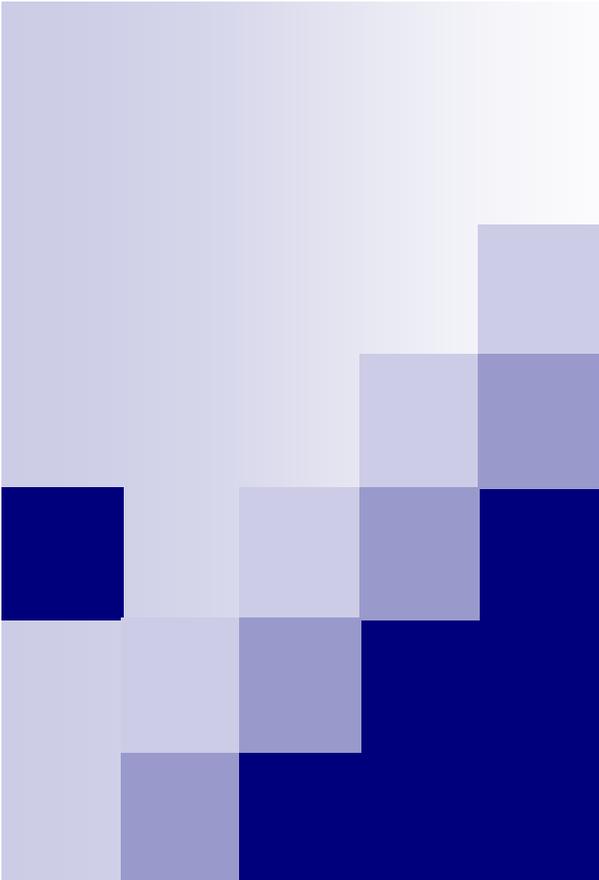
Heavy-Duty Vehicles
~ **50 MMTCO₂E**



*Preliminary ARB GHG Projections for 2020

Historical and Projected Population, Vehicle Miles Traveled (VMT) and GHG Growth





History: How Did We Get Here?

Paul MacCready

1982: GM Sunraycer
solar EV



GM Impact Photo: www.greencar.com



GM Sunraycer Photo: www.carstyling.ru

1989 Santana
(Impact/EV1) tested at
GM proving grounds in
Arizona



1990: ARB LEV I

- Declining Fleet Average Requirement
- Initial ZEV requirement located within LEV I as footnote:

“While meeting the fleet average standards, each manufacturer’s sales fleet shall be composed of at least 2% ZEVs in the model years 1998 through 2000, 5% ZEVs in 2001 and 2002 and 10% ZEVs in 2003 and subsequent.”



1990: ZEV Program Rationale

- Projected improvements in conventional technology not sufficient to meet air quality standards
- ZEVs avoid ICE vehicle emissions performance deterioration with age



1996: ZEV Regulation

- 10% ZEVs in 2003
- Early requirements eliminated
- ARB established agreements with large automakers to place technology demonstration fleet (“MOA” Vehicles):
- MOA vehicles very successful in operation
- Automakers claimed marketability challenges
- Design distinctions:
 - Most of those with reasonable performance made use of advanced batteries, except the Panasonic EV1
 - All used 2-4 x the energy per mile as a Panasonic EV1



1998: LEV II and ZEV

- LEV II: Lower emission stds for all vehicle categories
 - New SULEV emission standard
 - Near and zero evaporative requirements
- ZEV: moved to its own section (1962)
 - Partial ZEV (PZEV) credits for qualifying technologies
 - PZEVs substitution up to 6 percent for LVMs

1998: PZEVs

- SULEV exhaust emissions
 - Dual wall exhaust manifolds, close coupled catalyst plus downstream catalyst w/ integral adsorbers, linear O2 sensor, retarded timing at cold start, electric air injection, greater catalyst loading
- Zero evaporative emissions
 - Add. trap on canister vent, carbon vent on engine inlet, improved seals at joints/junctions, consolidation of parts to minimize junctions, better materials
- 15 yr/ 150,000 mi emissions warranty
- On board-diagnostics



Hybrid Electric Vehicles

1997: Toyota Prius
Believed to be instigated
by PNGV



1998: Honda Insight



2001: ZEV Amendments

- Maintained technology forcing mandate
- Phased in ZEV and PZEV requirements
- Allowed further offset with Advanced Technology PZEVs (AT PZEVs)
 - Technologies that lead to ZEVs
- Segregated NEVs and assigned them fractional ZEV credit
- Gradually increased future ZEV requirements



2001: ZEV Litigation

- Federal and State lawsuits
 - Linked credits to efficiency
 - Preliminary injunction issued June 2002, prohibiting ARB from enforcing the regulation in 2003 or 2004 model years
- The Board modified the regulation in 2003
- Settlement agreement for all cases signed August 2003

Fuel Cell Vehicles

FreedomCar: Cooperative research effort (Ford, GM, and DaimlerChrysler)

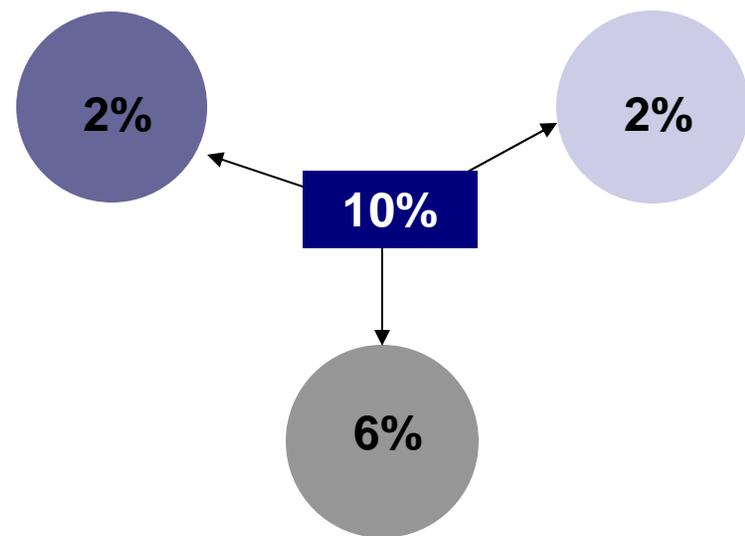
- Aimed at longer term goals



California Fuel Cell Partnership

2003: ZEV Amendments

- Changed calculation method for AT PZEVs
- Two Paths Created
 - Base Path: Banked Credits
 - Alternative Path: New placement of ZEVs
- Phases allowed vehicles to be placed in grouped demonstrations
 - Phase I: 2005-2008
 - Phase II: 2009-2011
 - Phase III: 2012-2014
 - Phase IV: 2015-2017
- PZEVs – up to 6%
- AT PZEVs – up to 2%
- 2005 Implementation





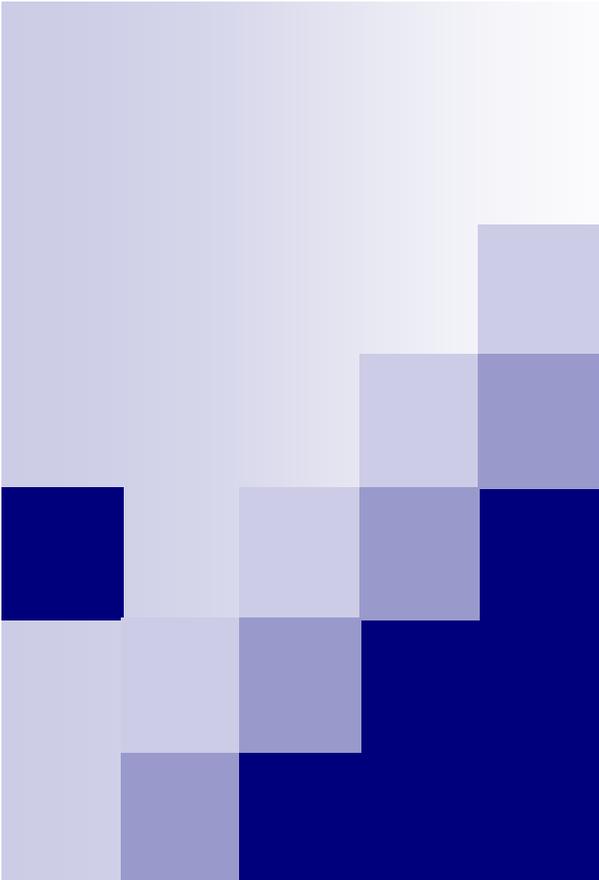
2004/2005: DOE Hydrogen Program

- Bush commits \$1.7 Billion over 5 years
- Energy Policy Act of 2005: authorizes \$3.28 billion
 - research and development, demonstrations and studies over 5 fiscal years aimed at getting hydrogen-powered autos on the road by 2020



2006 ZEV Expert Panel & 2008 Amendments

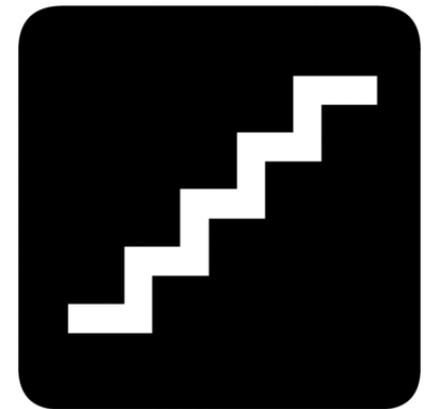
- Advances in lithium ion battery technology show great promise for battery EVs
- Plug-in Hybrid Electric Vehicles (PHEVs) likely to be commercially successful
- Encourage the production of plug-in hybrid electric vehicles (PHEV)
- Needed to be an adjustment in required number of ZEVs
- Transparency



The 2009 ZEV Regulation

ZEV Regulation Steps

- Step 1: Size Determination
- Step 2: ZEV Base Volume Determination
- Step 3: Requirement Determination
- Step 4: Allowances
- Step 5: Applicable Multiplier Determination
- Step 6: Total Credit Calculation
- Step 7: Rules on Credit Use
- Step 8: Special Provisions
- Step 9: Travel Provision
- Step 10: Demonstration of Compliance
- Step 11: Penalties





Step 1: Size Determination

Why Size Matters...

- Small (SVM)
 - CA sales less than 4,500; *Not Subject*
- Independent Small (ISVM)
 - CA sales less than 10,000; *Not Subject*
- Intermediate (IVM)
 - CA sales between 4,501 and 60,000; *Subject to Regulation*
 - *Can meet whole requirement with PZEVs*
- Large (LVM)
 - CA sales greater than 60,000; *Subject to Regulation*



Step 1: Size Determination

- Rolling average based on previous three consecutive model years sales of PC, LDTs, and MDVs

MY 2009 Example:

2006	2007	2008
59,745	63,800	67,350

Average: 63,631

Therefore, subject to LVM requirements



Step 1: Size Determination

What if my size changes?

- Due to Size Increase:
 - SVM → IVM = 5 year lead time
 - IVM → LVM = 5 year lead time
- Due to Size Decrease:
 - IVM → SVM = Following MY
 - LVM → IVM = Following MY
- Due to New Majority Ownership Agreements:
 - IVM+IVM = LVM : 3 year lead time

Step 1: Size Determination

Example: Increase in Size

MY	2004	2005	2006	2007	2008
Sales	45,000	53,000	59,000	63,000	64,000

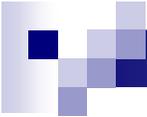
Averages

2004-2006: 52,333

2005-2007: 58,333

2006-2008: 62,000 ←

2009	2010	2011	2012	2013	2014
Avg. over 60,000	Still subject IVM Requirements				Subject to LVM Requirements



Step 1: Size Determination

How does ownership affect my size for ZEV?

- If one manufacturer has 50% or greater ownership in another manufacturer, their sales are aggregated for determining size

MY 2009 Example

Company A owns 60% of Company B (as of June 2003)

Company A 2006-08 Sales Average: 43,500

Company B 2006-08 Sales Average: 36,000

Company A and B Aggregated 2006-08 Sales: 79,500

Both are subject to the LVM ZEV requirements



Step 2: ZEV Base Volume Determination

What do you mean by ZEV Base Volume?

- The production volume on which your ZEV requirement is based
- Has nothing to do with your size determination calculation method



Step 2: ZEV Base Volume Determination

- A total or average of PCs, LDT1s, and LDT2s (as applicable)
- Two Methods: You can switch every year
- **Prior Years Method**
 - An average of the previous 4th, 5th, and 6th model year from model year in which you are complying
- **Same Year Method**
 - A projection of sales for the model year in which you are complying (2009 MY, use 2009 Sales)



Step 2: ZEV Base Volume Determination

Prior Years Method

- 2009 MY Example

2009 Compliance Year

2008 1st

2007 2nd

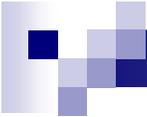
2006 3rd

2005 4th

2004 5th

2003 6th

} For the 2009 MY, manufacturers would use their 2003-2005 sales average when choosing the prior years method



Step 2: ZEV Base Volume Determination

- “LDT2s, as applicable”
- You will add increasingly in your LDT2 production over three model years to your ZEV Base Volume

2009	2010	2011	2012
51%	68%	85%	100%

- **Prior Years Method:** Add together LDT2 production from previous model years, take average, then multiply %
- **Same Year Method:** Multiply % to LDT2 production



Step 3: ZEV Requirement

Yearly ZEV Requirements

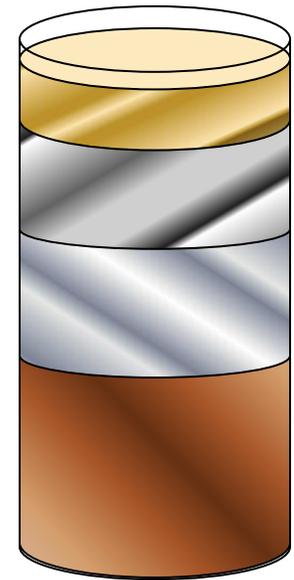
2009-2011	2012-2014	2015-2017	2018+
11%	12%	14%	16%

- Regulation dictates how requirement *must* and *may* be met
- Types of required and allowed vehicles: ZEVs, Enhanced AT PZEVs, AT PZEVs, and PZEVs

Step 3: ZEV Requirement

Let's Rank the Vehicle Credits:

1. ZEVs (Gold)
2. Enhanced AT PZEVs (Silver +)
3. AT PZEVs (Silver)
4. PZEVs (Bronze)



- Higher ranked vehicle credits may fulfill lower ranked credit percentages

ZEV Requirement: The ZEV Glass

2012 MY Example

This is how
the ZEV
requirement
is written



ZEV Requirement: The ZEV Glass

2012 MY Example

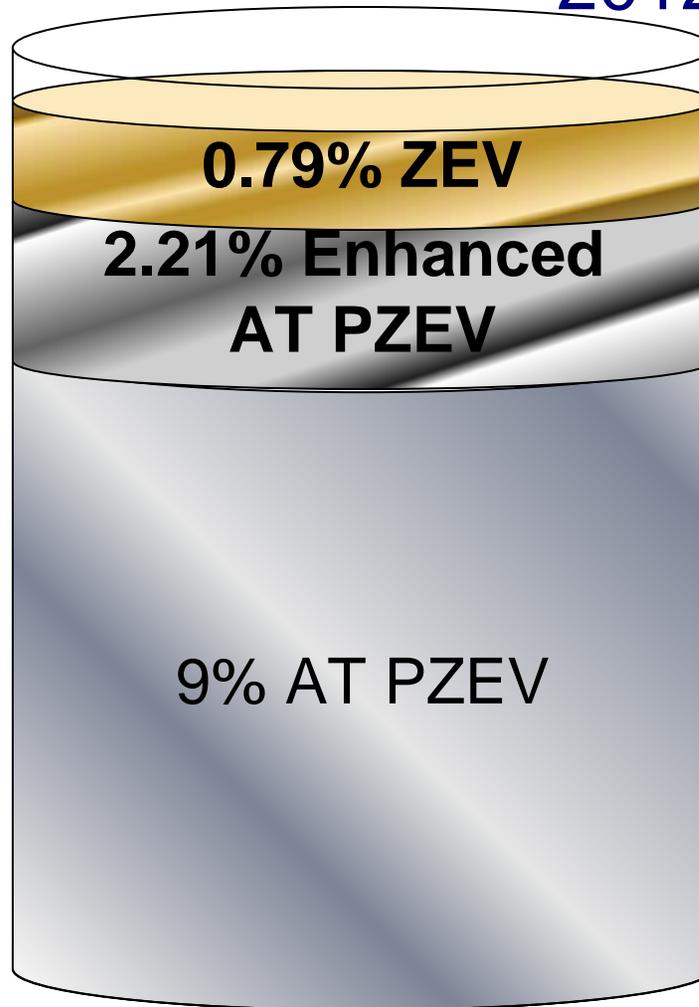
A Manufacturer
MUST fulfill their
ZEV requirement,
but may fulfill the
rest of their ZEV
requirement with
Enhanced AT
PZEVs



ZEV Requirement: The ZEV Glass

2012 MY Example

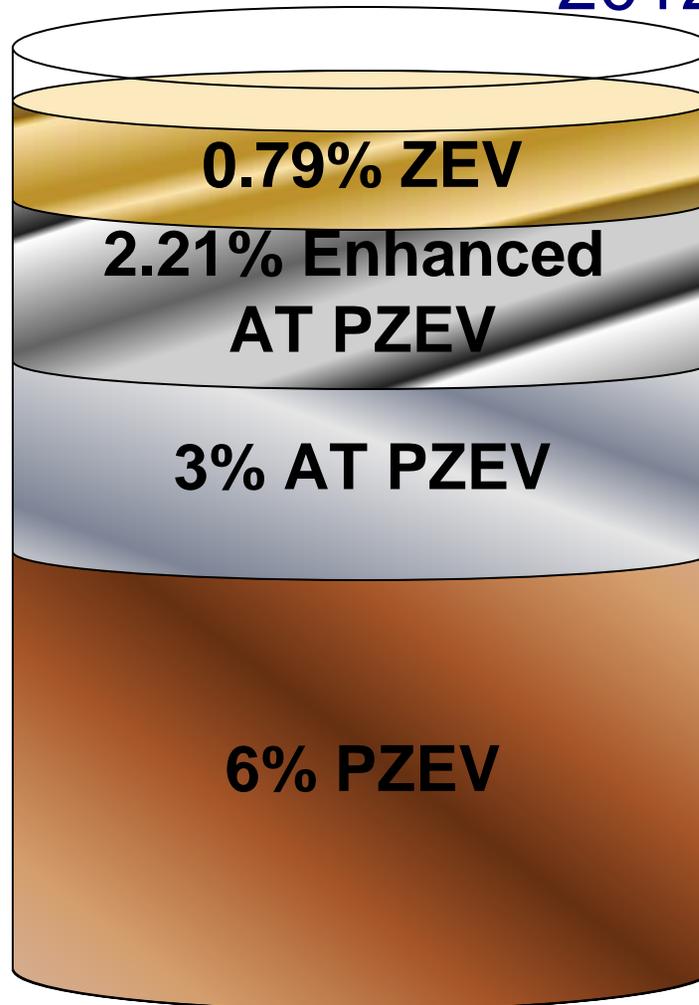
A Manufacturer MUST fulfill their ZEV requirement, but may fulfill the rest of their ZEV requirement with Enhanced AT PZEVs and AT PZEVs



ZEV Requirement: The ZEV Glass

2012 MY Example

A Manufacturer MUST fulfill their ZEV requirement, but may fulfill the rest of their ZEV requirement with Enhanced AT PZEVs, AT PZEVs and PZEVs



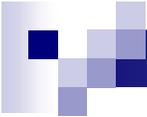
Most manufacturers choose to meet their requirement this way because it is the most cost effective way to meet the regulation



Step 3: ZEV Requirement

ZEVs: Alternative Path vs. Base Path

- Two paths until 2011
- Alternative Path
 - Market share of set number of ZEVs
 - New production of ZEVs
 - No banked credits
 - May be placed all at one time within 3 year window
- Base Path
 - Credits equal to 2% annually
 - Banked credits



Step 3: ZEV Requirement

2009 – 2011 Alt Path Req.:

- Credits from placed ZEVs equal to 0.82% of 2003-2005 average annual sales

OR

- A manufacturer's market share of 2,500 *Type III ZEVs*
(Same Number, different ways to calculate)
- Any type of ZEV may be used
- Required # rounded to nearest whole #



Step 3: ZEV Requirement

Any type of ZEV may be used

	Definition	Credit / vehicle	Req. #
Type V	300+ mi range FR*	7	1,427
Type IV	200+ mi range FR*	5	2,000
Type III	100+ FR*/200+ mi range	4	2,500
Type II	100+ mi range	3	3,333
Type I.5	75-100 mi range	2.5	4,000
Type I	50-75 mi range	2	5,000

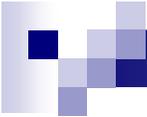
*Fast refueling



Step 3: ZEV Requirement

2009-2011 Alternative Path (cont.)

- May fulfill the rest of their requirement with AT PZEVs and PZEVs
- May only fulfill 6% of 11% requirement with PZEVs



Step 3: ZEV Requirement

Example Alt Path ZEV Obligation Calculation

- Sales Volume = 100,000 cars
 - Market share = 15%
 - Total 11% credit obligation = 11,000
 - **Must** place 375 ZEVs (equal to 1500 credits)
 - **May** generate 3,500 credits from AT PZEVs
 - **May** generate 6,000 credits from PZEVs
- *Divide out credits to translate into # of required vehicles



Step 3: ZEV Requirement

Example Base ZEV Obligation Calculation

- Sales Volume = 100,000 cars
 - Total 11% credit obligation = 11,000
 - **Must** generate 2,500 credits from ZEVs
 - **May** generate 2,500 credits from AT PZEVs
 - **May** generate 6,000 credits from PZEVs
- *Divide out credits to translate into # of required vehicles



Step 3: ZEV Requirement

2012-2014: The New Path

- ZEV: Credits equal to 0.93% or up to 3% of a manufacturer's ZEV base volume
- Enhanced AT PZEV: Credits equal 2.07% of a manufacturer's ZEV base volume
- AT PZEV: Credits equal to 2% of a manufacturer's ZEV base volume
- PZEV: Credits equal to 6% of a manufacturer's ZEV base volume



Step 3: ZEV Requirement

Example Base ZEV Obligation Calculation

- Sales Volume = 100,000 cars
- Total 12% credit obligation = 12,000
- **Must** generate 790 credits from ZEVs
- **May** generate 2,210 credits from Enhanced AT PZEVs
- **May** generate 2,000 credits from AT PZEVs
- **May** generate 6,000 credits from PZEVs

*Divide out credits to translate into # of required vehicles



Step 4: Allowances

4 Types of Allowances

- PZEV Allowance
- Zero Emission Fuel Cycle Allowance
- Zero Emission Vehicle Miles Traveled (VMT) Allowance
- Advanced Componentry Allowance



Step 4: Allowances

PZEV Allowance

- **0.2 allowance** for vehicles that:
 - Meet SULEV emission standards
 - Have zero evaporative emissions
 - Will meet OBD requirements for 150,000 mi
 - 15 year/150,000 mi extended emissions warranty



Step 4: Allowances

Low Fuel Cycle Emission Allowance

- NMOG \leq 0.01 grams/mi
 - Including near-term production methods and infrastructure
- Vehicle must exclusively use fuel
- Allowance = 0.3
- Qualifying Fuels: CNG, Hydrogen



Step 4: Allowances

Zero-Emission VMT Allowance

- Equivalent All Electric Range (EAER)
 - Used for “blended” PHEVs
- Urban charge depletion range actual (R_{cda})
 - Used for “non-blended” PHEVs
- Utility Factor (UF) – Found in SAE J2841
- **Qualifying vehicles must have an EAER and $R_{cda} \geq 10$ miles**

Step 4: Allowances

Zero Emission VMT Allowance (cont.)

Equation for PHEVs EAER & R_{cda} between 10 and 40

Determined by Test
Procedure

Use Fleet UF SAE
J2841, Sec. 4.5.2,
use given R_{cda} in
UF equation

$$\frac{\text{EAER} \times (1 - \text{UF}_{\text{Rcda}})}{11.028}$$

Constant 11.028

Determined by
Test
Procedure



Step 4: Allowances

Zero Emission VMT Allowance (cont.)

Examples:

EAER	Rcda	VMT All.
10	10	.700
10	12	.725
15	18	.846
15	15	.927
20	25	.972
20	20	1.094
40	40	1.35

Step 4: Allowances

Advanced Componentry

- Each Type Requires: traction drive boost, regenerative braking, idle start/stop

	Type C	Type D	Type E	Type F	Type G
Peak Power Output	≥ 10 kW	≥ 10 kW	≥ 50 kW	≥ 10 mi AER UDDS	≥ 10 mi AER US06
Traction Voltage	< 60 V	≥ 60 V	≥ 60 V	≥ 60 V	≥ 60 V
09-11	0.2	0.4	0.5	0.72	0.95
12-14	0.15	0.35	0.45	0.67	0.9



Step 4: Allowances

Advanced Componentry (cont.)

- Gaseous fuel (3600 psi) =
0.2 AC allowance
- Hydrogen fuel (5000 psi) =
0.3 AC allowance



Step 5: Applicable Multiplier Determination

PHEV Introduction Multiplier

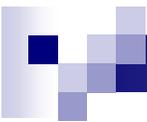
- 1.25 Multiplier
- Available to 2009-2011 Model Year PHEVs
- Available to vehicles sold
- Available to vehicles leased for 3 years, and given the option to purchase or re-lease for an additional 2 years



Step 5: Applicable Multiplier Determination

ZEV Introduction Multiplier

- 1.25 Multiplier
- Available to 2009-2011 Model Year ZEVs
 - Excludes NEVs and Type 0 ZEVs
- Available to vehicles sold
- Available to vehicles leased for 3 years, and given the option to purchase or re-lease for an additional 2 years



Step 5: Applicable Multiplier Determination

Extended Service Multiplier

- Offered to 1997-2003 model year ZEVs and ≥ 10 mile zero emission VMT allowance PZEVs
- Vehicles qualify for multiplier in the fourth model year it is still registered in California
- Vehicles Placed after April 24, 2003
 - Receive 0.2 times the credit they would receive if placed in the compliance model year

For Example: 10 Type IIs placed in May 2003

Each vehicle still registered receives 0.6 credits in 2009

$(0.2 * \text{Credit Earned if placed in 2009 (3)}) = 0.6$



Step 6: Total Credit Calculation

PZEVs

- Earn 0.2 credits each



Step 6: Total Credit Calculation

AT PZEVs

0.2 PZEV Allowance + Adv. Comp. + Low Fuel Cycle

=

Total AT PZEV Credit

For Example:

- Type D Hybrid = 0.6 Credits Total
- CNG Vehicle = 0.7 Credits Total



Step 6: Total Credit Calculation

Enhanced AT PZEV

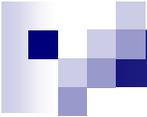
0.2 PZEV Allowance + Zero Emission VMT + Adv.
Componentry + Low Fuel Cycle Emissions = X

X * Early Intro Mult. = Total Enhanced AT PZEV Credit

For Example:

(Sold) 2009 Type F 10 mi EAER PHEV = 2.03
Credits

2012 Type F 10 mi EAER PHEV = 1.57 Credits



Step 6: Total Credit Calculation

ZEVs

- Earns 1 credit for delivery into CA
- Earns additional credit when placed in service

Total Credit Earned		
	2009-17	2018+
Type 0	1	1
Type I	2	2
Type I.5	2.5	2.5
Type II	3	3
Type III	4	3
Type IV	5	3
Type V	7	3



Step 6: Total Credit Calculation

NEVs

- Earn 0.3 credits
- MY 2010 NEVs: must meet technological requirements:
 - Acceleration
 - Top Speed
 - Constant Speed Range
 - Sealed, maintenance-free batteries
- MY 2010 NEVs: Must meet 24 mo. warranty requirement



Step 7: Rules on Credit Use

General Rules

- All credits produced in excess of a manufacturer's requirements may be "banked" for future use
- Credits earned from all types of vehicles may be traded or sold to any other party
 - No, we do not know how much a credit costs
- Traded credits can be used the same way credits earned from vehicles placed



Step 7: Rules on Credit Use

PZEVs

- 2009 – 2011: May only meet up to 55% of a manufacturer's ZEV requirement (or up to 6% out of the 11% requirement)
- 2012 – 2014: May only meet up to 50% of a manufacturer's ZEV requirement (or 6% out of the 12% requirement)



Step 7: Rules on Credit Use

AT PZEVs

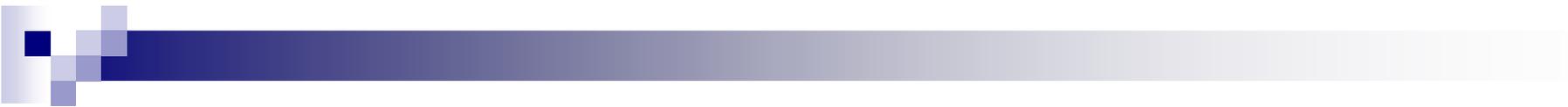
- 2009 – 2011: May meet up to 72.5% of a manufacturer's base ZEV requirement (or up to 8.5% out of the 11% requirement)
- 2009-2011: May meet up to 100% of their ZEV requirement, as long as their Alternative Path Requirement is fulfilled
- 2012 – 2014: May only meet up to 75% of a manufacturer's ZEV requirement (or 9% out of the 12% requirement)



Step 7: Rules on Credit Use

Enhanced AT PZEVs

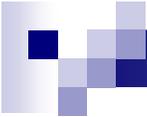
- 2012-2014: May meet up to 93.4% of a manufacturer's ZEV requirement (or up to 11.21% out of the 12% requirement)



Step 7: Rules on Credit Use

ZEVs: Carry Forward Provision for LVMs

- 2005 – 2008 model year ZEVs
 - Credits from ZEVs earned during this timeframe may be “carried forward” and applied to entire 2009-2011 ZEV obligation
 - Beginning in 2012, these 2005-08 ZEV credits may only be applied to the Enhanced AT PZEV, AT PZEV, and PZEV categories



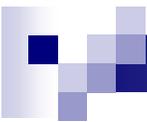
Step 7: Rules on Credit Use

ZEVs: Carry Forward Provision for LVMs (cont.)

- 2009 and subsequent MY ZEV credits
 - Credits from ZEVs earned may be “carried forward” for 2 additional MYs and applied towards ZEV only requirement
 - Beginning in 3rd subsequent MY, these ZEV credits may only be applied to the Enhanced AT PZEV, AT PZEV, and PZEV categories

Example

- 2010 MY ZEV credit earned
- 2010, 2011, and 2012: Same ZEV credit may go toward entire requirement, including the min. ZEV %
- 2013: Same ZEV credit may only be used towards Enhanced AT PZEV, AT PZEV, and PZEV categories



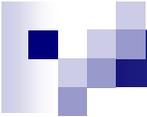
Step 7: Rules on Credit Use

ZEV: Carry Forward Provision for Other OEMs

- 2005 and subsequent MY ZEV Credits
 - Non-LVMs may earn and bank their ZEV credits until subject to LVM requirements
 - When the manufacturer becomes subject to LVM requirements, the LVM carry forward provision applies.

Example

- 2007 ZEV credit earned by IVM
- 2012: IVM becomes subject to LVM requirements
- 2012, 2013, and 2014: 2007 ZEV credit earned may go toward entire ZEV requirement
- 2015 and subsequent: 2007 ZEV credit only goes toward Enhanced AT PZEV, AT PZEV, and PZEV



Step 7: Rules on Credit Use

ZEV: Carry Forward Provision for Other OEMs

- 2005 and subsequent MY ZEV Credits
 - Trades/sales also trigger LVM carry forward provision

Example

- 2009 ZEV credit earned by SVM
- 2011: SVM sells (2009) credit to LVM
- LVM can use sold 2009 ZEV credit for min. ZEV % only in 2011
 - Carry forward provision kicks in retroactively, the SVM's 2009 credit for min. ZEV % until 2011
- 2012 and subsequent: sold 2009 ZEV credit only goes toward Enhanced AT PZEV, AT PZEV, and PZEV



Step 7: Rules on Credit Use

Neighborhood Electric Vehicles

2001-2005 NEVs

Model Years	Obligation	Allowed %
2009-2011	ZEVs	Up to 50%
2009	AT PZEVs, but not PZEVs	Up to 75%
2010-2011		Up to 50%
2009-2011	PZEVs	100%



Step 7: Rules on Credit Use

NEVs (cont.)

- 2001-2005 NEVs

Model Years	Obligation	Allowed %
2012-2014	ZEVs	0%
2012-2014	AT PZEVs, but not PZEVs	50%
2012-2014	PZEVs	100%



Step 7: Rules on Credit Use

NEVs (cont.)

- 2006 and Subsequent NEVs

Model Years	Obligation	Allowed %
2009-2011	Alt Path ZEV Req.	0%
2009-2011	ALL Base Path and AT PZEV and PZEV Req.	100%
2012-2014	ZEV	0%
2012-2014	Enhanced, AT PZEV, PZEV	100%



Step 8: Special Provisions

Advanced Demonstration Credits

- Available for ZEVs and Enhanced AT PZEVs
- Available for 2009-2014 MY vehicles
- For vehicles not delivered for sale or registered with the DMV
- Must be placed for 2 years, 50% of time in CA
- Limited to 25 vehicles per model per ZEV state per year



Step 8: Special Provisions

Advanced Demonstration Credits (cont.)

Manufacturer's Advisory Compliance (MAC) 06-02
specifies guidelines for Advanced Demos:

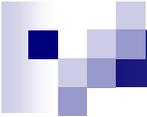
<http://www.arb.ca.gov/msprog/macs/macs.htm>



Step 8: Special Provisions

Transportation System Credits

- For vehicles placed in projects with innovative transportation systems
- Types of Credits Earned
 - Shared Use and Intelligent Technologies
 - Linkage to Transit
- Manufacturers must have EO approval in order to earn these credits
- ZEVs: Can earn credit for either or both
- Non-ZEVs: Can earn credit only for Shared Use or for both, but not just for linkage to transit



Step 8: Special Provisions

Transportation System Credits (cont.)

2009-2011	Shared Use/ Intelligence	Link to Transit
PZEV	2	1
AT PZEV	4	2
Enhanced AT PZEV	4	2
ZEV	6	3
2012 and beyond		
Enhanced AT PZEV	1	1
ZEV	2	1



Step 8: Special Provisions

Transportation System Credits (cont.)

- Caps placed on use of these credits
- ZEVs TSCs = up to 1/10th of ZEV Req.
- Enhanced AT PZEVs TSCs = up to 1/10th of Enhanced AT PZEV Req.
- AT PZEVs TSCs = up to 1/20th of AT PZEV Req.
- PZEV TSCs = up to 1/50th of PZEV Req.



Step 9: Travel Provision

- **“Section 177 State”**: a state that is administering the California ZEV requirements pursuant to section 177 of the federal Clean Air Act (42 U.S.C. Sec. 7507)
- Applies to ZEVs
 - Excludes Type 0s and NEVs
 - Type I, I.5, and II ZEVs: 2009-2014
 - Type III, IV, or V ZEVs: 2009-2017
- Can be Advanced Demos or placed in service
 - In California or in Section 177 State



Step 9: Travel Provision

2009 Model Year

- ZEV credits can be used to meet CA ZEV requirements and “traveled” to meet Section 177 States’ requirements
- ZEV credits “travel” to and from CA at full value



Step 9: Travel Provision

2010 through 2017 Model Years

- ZEVs placed in CA “travel” at proportional value to Section 177 States
 - Multiply the ratio of the manufacturers’ Section 177 state sales to the manufacturers’ CA sales

Example

- Manufacturer X’s NY sales = 50% of CA sales
- 10 Type V ZEVs placed in CA = 40 credits
- “Traveled” Type V ZEV credits in NY = 20 credits



Step 9: Travel Provision

2010 and 2011 Model Years

- For manufacturers on the Alt Path
 - ZEV credits earned from vehicles placed in CA can “travel” at full value up to meeting the manufacturer’s Section 177 State Alt Path req.
 - Any vehicles above and beyond the Section 177 State Alt Path req. travel at a proportional value



Step 9: Travel Provision

2010 and 2011 Model Years

- Example
 - Manufacturer B: 300 Type III ZEVs Placed in CA (1200 credits earned in CA)
 - Manufacturer B's NY Alt Path Req. = 50 Type III ZEVs (or 200 credits)
 - Manufacturer B's NY sales = 50% of CA sales
 - 50 Type III ZEVs "travel" at full value to NY to meet NY Alt Path req. (worth 200 credits)
 - Other 250 Type III ZEVs "travel" at proportional value to NY (worth 500 credits)



Step 10: Demonstration of Compliance

- For manufacturers subject to the regulation, all compliance reports are due May 1 of the calendar year following the compliance model year
 - for 2008 MY, reports are due May 1, 2009
- Manufacturers may update reports until September
- Manufacturers not subject may submit credits at any time
- Credit trades or sales may be reported at anytime



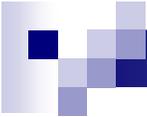
Step 10: Demonstration of Compliance

Manufacturer's Advisory Compliance 06-03

- Document outlines all reporting forms and guidelines for reporting compliance

- MAC 06-03 may be found here:

<http://www.arb.ca.gov/msprog/mac/mac.htm>



Step 10: Demonstration of Compliance

Public Disclosure

- 2009 MY: Each manufacturer's annual production and ZEV credits earned per vehicle will be available to public
- 2010 MY: Each manufacturer's annual ZEV credit balances, including credits from transportation systems, advanced demonstrations, and trades and sales from other parties will be available to public



Step 11: Penalties

What happens if you don't fully comply?

1. Manufacturers have 2 additional years to make up a ZEV deficit
2. If the manufacturer still fails to comply, the manufacturer is subject to financial penalties outlined in HSC 43211



Step 11: Penalties

Health and Safety Code 43211

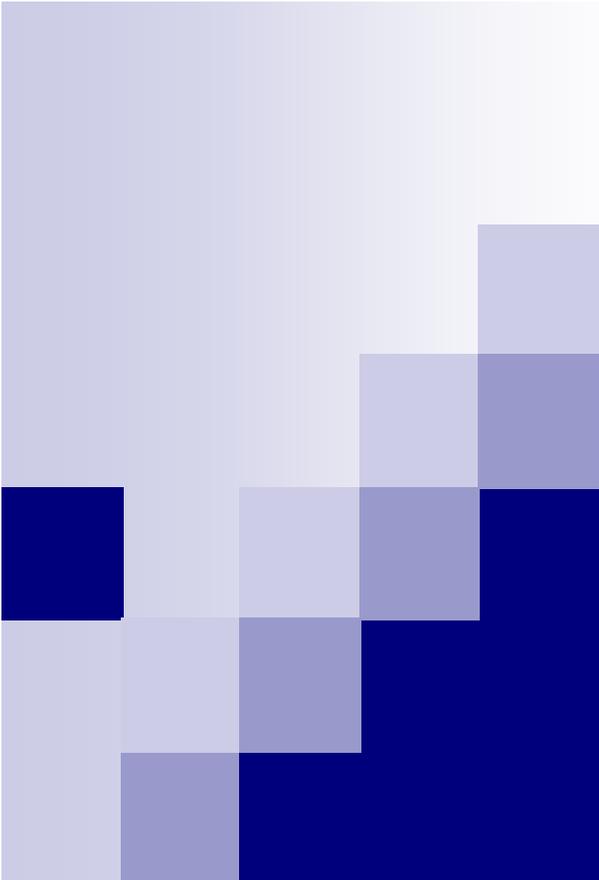
- \$5,000 penalty per vehicle not produced
- 1 ZEV credit = Type 0 ZEV (default ZEV)
- 1 ZEV credit = 1 vehicle
- Therefore, \$5,000 penalty per each ZEV credit not produced



Step 11: Penalties

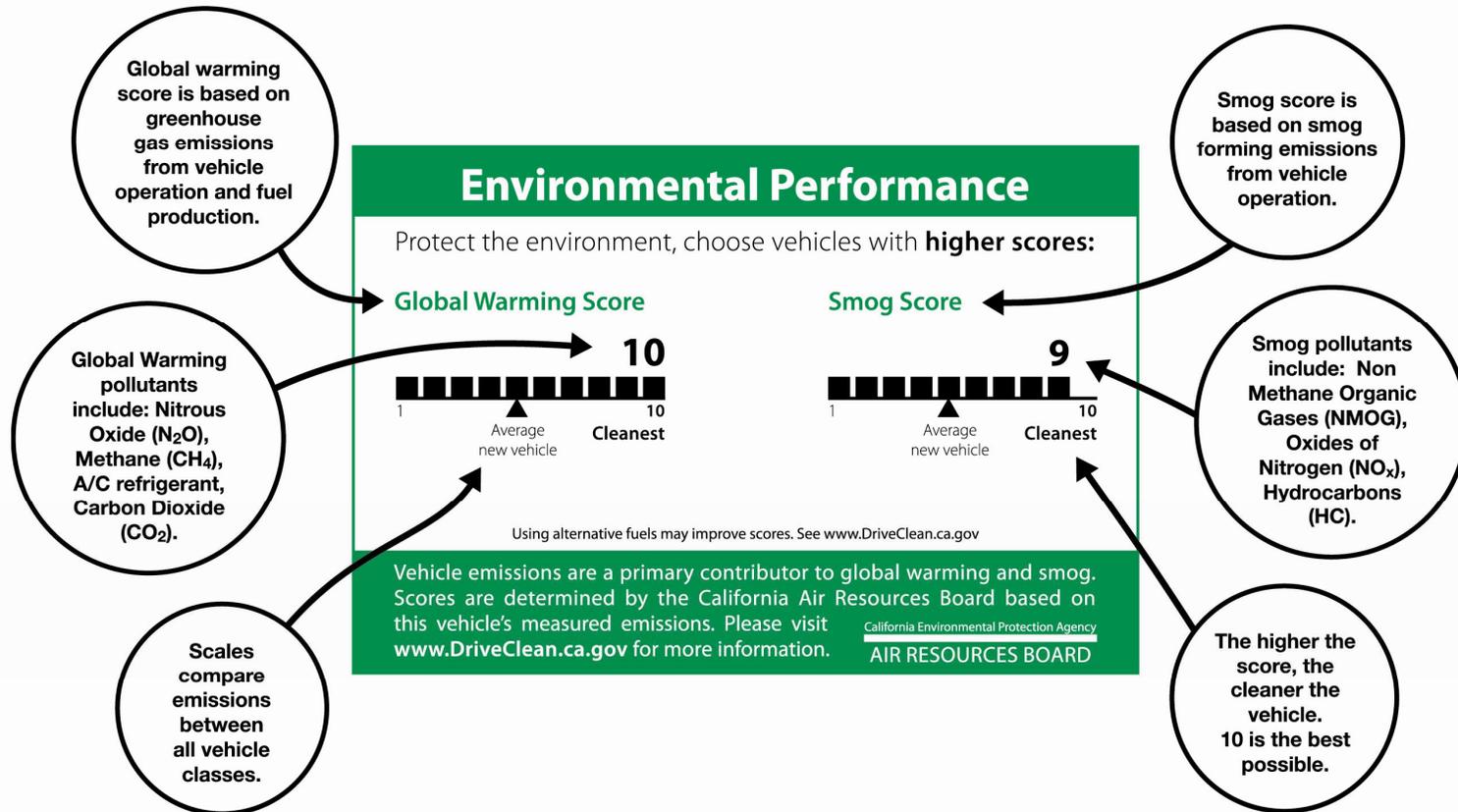
Example

- Manufacturer X's 2009 ZEV Requirement: 6,000 Credits
- Manufacturer X produces 5,500 Credits and does not make up their deficit
 - Does not matter which type of vehicle the manufacturer fails to produce
- 500 Credits * \$5,000 = \$2.5 million



ARB's Role in ZEV Commercialization

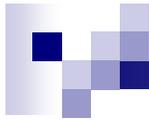
Environmental Performance Label





Environmental Performance Label

- Required to be on all new vehicles as of January 1, 2009
- Includes both Smog score and Global Warming Score
 - Based on 1-10 scale, 10 being the cleanest
 - Smog score based on vehicle operation
 - Global Warming score based on upstream and vehicle operation
- All vehicles compared to avg. vehicle in a given model year



DriveClean.

ca.gov

A guide to clean and efficient vehicle technology



Purpose

- A clean car buying guide
- Educate and influence California consumers about current and future clean technology vehicles and alternative fuels
- Provide Smog and Global Warming scores on cars certified in California
- Search incentives



Features

- Environmental Performance scores
- Search clean cars by make and model
- Search by category type
- Compare vehicles side by side
- Search by technology and fuel types
- Popular searches

Enhanced Interface

DriveClean.ca.gov
A guide to clean and efficient vehicle technology

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Search DriveClean

How to Drive Clean | Charging & Fueling | Resources | Environmental Performance | About this Site

SHRE | Email | Print

Search & Explore

- By Vehicle
- By Make/Model
- By Category
- By Technologies & Fuel Types
- By Smog Score
- By Global Warming Score
- By Engine Family
- By Incentives
- Compare Your Car
- Rate Your Clean Car

DriveClean Buying Guide

Looking to reduce your carbon footprint? Your car is the place to start. While gas-fueled cars dominate the roads, alternatives exist now and in the future.

Start Your Research

Browse by Make and Model:

Make: [Dropdown]
Year: [Dropdown]
Model: [Dropdown]
Find a Car

By Category:

- Sedan
- Wagon
- Van/Minivan
- Coupe
- Pickup
- Luxury
- Convertible
- SUV
- Neighborhood

Technologies & Fuel Types

- Hybrid Electric [more >>](#)
- Battery Electric [more >>](#)
- Compressed Natural Gas [more >>](#)
- E85 Ethanol (E85) Flex Fuel [more >>](#)
- Gasoline [more >>](#)
- Diesel [more >>](#)

Quick Compare

Vehicle 1 Clear

- All Makes
- All Models
- All Variants

Vehicle 2 Clear

- All Makes
- All Models
- All Variants

Vehicle 3 Clear

- All Makes
- All Models
- All Variants

Compare

Buy with Confidence

- 1 Do Your Research
Understand the different technologies and features.
[Start Researching >>](#)
- 2 Find the Vehicle for You
Finding the vehicle that suits your needs is key.
[Find Now >>](#)

Popular Searches

Cleanest Cars		Sedans	Gasoline Powered	Hybrid SUVs
Vehicle	Smog score:	Vehicle	Smog score:	Vehicle
2008 Tesla Roadster (Electric)	10	2009 Toyota Prius (Hybrid)	9	
2008 GEMs (Electric)	10	2009 Honda Civic Hybrid	9	
2008 ZENN Electric Vehicles	10	2009 Honda Civic GX (CNG)	9	
2008 Miles Electric Vehicles	10	2009 Nissan Altima Hybrid	9	
2009 Honda FCX Clarity	10			

[Print](#) | [View All >>](#)

Search by Smog Score

Slide the arrow to view vehicles by their smog score then press the Search button.

SMOG SCORE: 1

SEARCH

California State Seal

DriveClean.ca.gov
DriveClean.ca.gov is a web site of the California Air Resources Board developed as a resource for car buyers to find clean technology vehicles.

The web site is designed to educate Californians of the large difference in pollution levels between vehicles, and the variety of clean vehicle options available today that offer the same performance and luxury features as traditional gasoline vehicles.

DriveClean.ca.gov provides educational information on clean advanced technologies, and offers a variety of useful search and comparison tools to help car buyers find the cleanest vehicle that suits their lifestyle.

Search & Explore
By: Vehicle | Make/Model | Category | Technologies & Fuel Types | Smog Score | Engine Family | Incentives | Compare Your Car | Rate Your Clean Car

Do Your Research
How to Drive Clean | Charging & Fueling | Environmental Performance | Glossary | Frequently Asked Questions | News & Reviews | Related Resources & Links

Find Special Resources & Information
For: Media | Fleets | Dealers | Car Buyers

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Coming July 2009

DriveClean.
ca.gov
A guide to clean and efficient vehicle technology



FUELING ALTERNATIVESSM

CALIFORNIA'S ALTERNATIVE FUEL VEHICLE REBATE PROGRAM

- Alternative Fuel Vehicle Incentive Program
 - AB 1811
 - Clean vehicle incentives
 - Battery EVs
 - Fuel Cell Vehicles
 - NEVs
 - CNG Vehicles
 - Up to \$5,000 rebate for eligible vehicles



Air Quality Improvement Program

- ARB's portion of funds from AB 118
 - Termed AQIP
- Similar to Alternative Fuel Vehicle Incentive Program
 - Includes High Speed Freeway Capable Motorcycles
- Funding will become available Q3 2009

California Fuel Cell Partnership

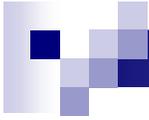
Driving for the Future



California Fuel Cell Partnership

- Collaboration of 30 member companies working together to promote the commercialization of hydrogen fuel cell vehicles
 - automobile manufacturers
 - energy providers
 - government agencies
 - fuel cell technology companies
 - transit authorities





CaFCP 2009 Action Plan

46 Stations

Santa Monica, Irvine, Torrance, Newport Beach, San Francisco, Sacramento

3 Focus Areas

Passenger vehicles
Transit buses
Regulations, Codes & Standards

4 Years

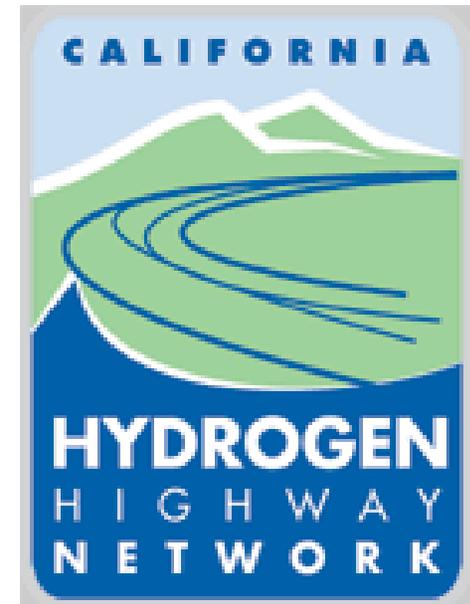
Funding 2009-2012
Stations begin operation 2009-2014

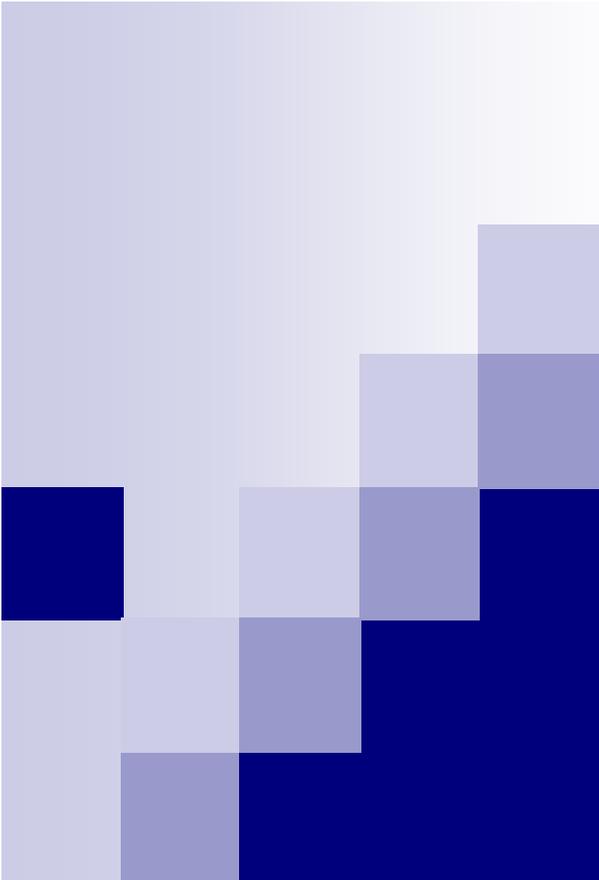
\$180 Million

Industry and government investment

California Hydrogen Highway

- ARB co-funding: 7 stations awarded to date (\$14.4M)
- CEC through AB 118
- Hydrogen communities
 - Placed with vehicle rollouts
 - Full retail setting
 - 350/700 bar dispensing
- SB 1505: 33% renewable and cleaner than gasoline well-to-wheel





Section 177 States



Presentation Overview

- Clean Air Act authority (Section 177)
- State actions and status
 - New York, Massachusetts, Maine, Vermont, New Jersey, Connecticut, Rhode Island, Maryland
- Alternative Compliance Plan and Proportional Credits
- Travel Provision



Clean Air Act Section 177

- States may adopt and enforce motor vehicle standards if:
 - Standards are identical to CA standards for which a waiver has been granted for that model year, and
 - CA and state adopt standards at least two years before commencement of model year
- Cannot limit sale of CA vehicles in state
- Cannot create “third vehicle”



Clean Air Act Section 177

- “Standards”
 - A standard is numerical limit on emissions
 - State must adopt all standards in a weight class
- “Identical”
 - Numerical limits must be same as CA
 - Enforcement procedures may differ
- New York case established when states can adopt and enforce
 - Adopt after CA adopts (Board hearing)
 - Enforce after CA waiver approved by EPA

Northeast State Actions*

Program Attribute	CT	ME	MA	NJ	NY	RI	VT	MD	PA
LEV I Start (first model year)	n/a	2001 for Passenger cars 2003 for Medium duty vehicles	1994	n/a	1996 (previously adopted 1993 CA standards)	n/a	2000 for 0 – 5750; 2004 for 0 - 14000	n/a	n/a
LEV II start (first model year)	2008	2004	2004	2009	2004	2008	2004	2011	2008
ZEV start	2008	2009	2007	2009	2007	2008	2007	2011	n/a
GHG Start	2009	2009	2009	2009	2009	2009	2009	2011	2009

*states outside of the northeast have adopted the California standards with the ZEV requirements



Northeast States Alternative Compliance Plan

- Vehicles sold and marketed in CA must be available in Northeast states
- Manufacturer compliance plans approved and enforced on state-by-state basis
- Alternative Compliance Plan does not affect other aspects of LEV program
- Alternative Compliance Plans ended in 2009



Elements of ACP

- Core credit scheme
 - Same as CA
- Northeast phase in multipliers
 - Three year phase-in
- ZEV and AT PZEV percentage requirements
 - Three year phase-in
- Infrastructure and transportation system projects
 - Credit available for special projects
 - Capped at 25% of manufacturer obligation
 - Sunset at end of 2006 model year



Proportional ZEV Credits

- 5 states have “proportional credit” programs
- ME, MD, RI, CT, NJ
- Manufacturers have a bank of credit in each of these states equal to:

S 177 vehicle sales/CA vehicle sales

X

Number of ZEV credits banked in CA



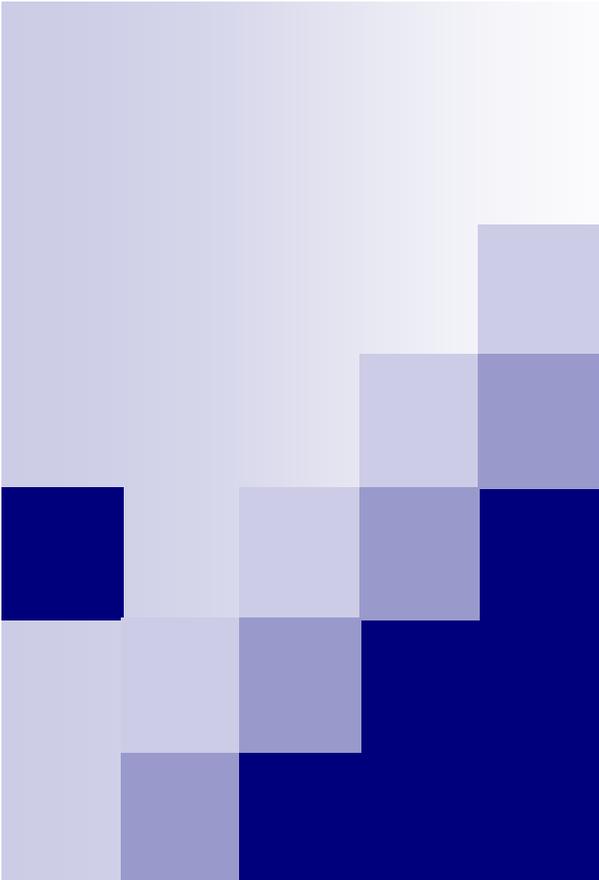
Proportional Credits (continued)

- S. 177 state credits are based on the amount of credit banked in California in the year prior to the start of the S. 177 state ZEV program
- Some states provide more credit for ZEVs placed in the S. 177 state than for transferred credits



Travel Provision

- Travel provision allows manufacturers to count ZEVs placed in any S. 177 state towards the ZEV obligation in California, and vice versa
- Credit transfers from state to state are done “proportionally”
- Travel provision now includes battery electric vehicles in addition to fuel cell vehicles
- Sunset years for travel provision changed in latest ZEV program revision
- Impact of travel provision on the northeast ZEV programs will depend on how manufacturers comply with the ZEV program requirements

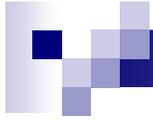


Looking Forward: ZEV 2.0



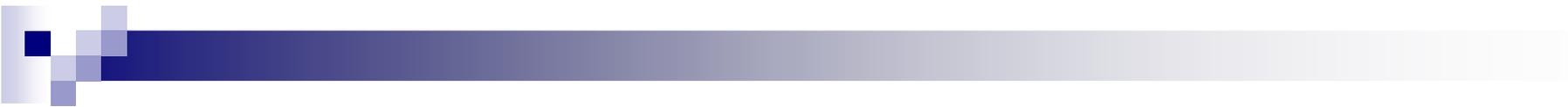
ZEV 2.0 Guiding Principles

- ZEV mass commercialization is essential in meeting California's long term GHG, air quality, and petroleum independence goals
- ZEVs still need to be mandated
- Simplicity is necessary
- Transparency makes for an effective and ethical regulation
- There is no "silver bullet"



ZEV 2.0 Vision Statement

To ensure cost effective zero emission vehicle alternatives are available to California consumers.



Resolution 08-24

- At the March 2008 hearing, the Board directed staff to consider and incorporate the following into a redesigned ZEV regulation:
 - Review LEV, ZEV, and Pavley from smog and GHG perspective
 - Redesign 2015 and subsequent model year requirements
 - Strengthen and focus requirements on “gold” vehicles, that is ZEVs and Enhanced AT PZEVs
 - Move from demonstrations to commercialization in order to meet California’s GHG goals
 - Look at different parameters for blended PHEVs
 - Return to the Board by the end of 2009



What does this mean?

- PZEVs → LEV III
- AT PZEVs (HEVs) → Pavley II
- ZEV regulation focuses on Enhanced AT PZEVs and ZEVs
 - Much greater numbers than currently required
 - Based on GHG and criteria pollutants



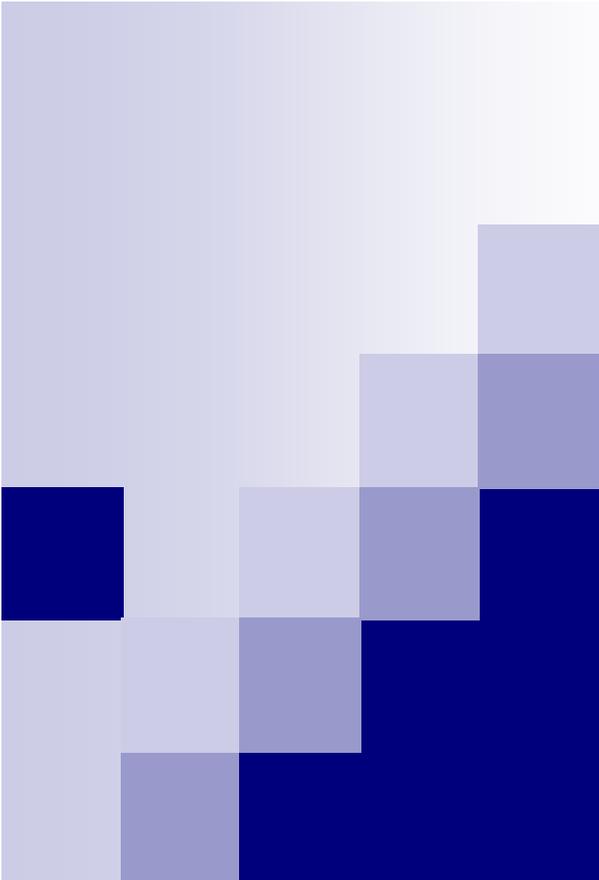
ZEV 2.0 Action Items

- White Paper
 - GHG Analysis Document
 - Plug-in and Battery EV Infrastructure Document
 - Technical Support Document
- Update to the Board



ZEV 2.0 Timeline

- September: Draft Technical Support Document and EV Infrastructure Document Released
- September 21 & 22: ZEV Symposium
- September 23: Infrastructure Workshop
- November 10: Final White Paper with all attachments released
- December 10: Staff provides update to the Board
- Q3 or Q4 2010: Regulatory Proposal Goes to Board



Conclusion

ZEVs are here...



Honda Clarity

Hydrogen Fuel Cell Vehicle

Range: 300+ mi

Available to Public for Lease

Tesla Roadster

Battery Electric Vehicle

Range: 200+ mi

Available to Public for Sale



...and here....



BMW Mini E

Battery Electric Vehicle

Range: 100+ mi

Available to Public for Lease

...and ZEVs are coming...

Chevrolet Volt

Plug-In Hybrid Electric Vehicle

Range: 40 mi All Electric

Publicly Stated Release: 2010



Mitsubishi iMiev

Battery Electric Vehicle

Range: 75 mi

Publicly Stated Release: 2010

...and coming...

Toyota EV

Battery Electric Vehicle

Range: Unknown

Publically Stated Release: 2012



Jaguar XJ

Plug-In Hybrid

Range: 30 mi All Electric

Publically Stated Release: 2011



...and coming!

Nissan EV

- Battery Electric Vehicle
- Range: 100 mi
- Publically Stated Release: 2010

Ford Plug-in Hybrid Escape

- Plug-in Hybrid
- Range: 10-20 All Electric
- Publically Stated Release: 2012

Ford Transit Connect

- Battery Electric Vehicle
- Range: 100 mi
- Publically Stated Release: 2010

Mercedes B Class Fuel Cell

- Fuel Cell Vehicle
- Range: 300 + mi
- Publically Stated Release: 2015

Toyota Plug-In Prius

- Plug-In Hybrid
- Range: 10-20 All Electric
- Publically Stated Release: 2010

Smart Electric Vehicle

- Battery Electric Vehicle
- Range: 100 mi
- Publically Stated Release: 2010 (Europe)

Chrysler

- Battery Electric Vehicle
- Range: Unknown
- Publically Stated Release: 2010